

What is claimed is:

1. A scanning optical system for dynamically deflecting a plurality of beams simultaneously and thereby scanning the beams in a main scanning direction on a scan target surface, comprising:

a light source having a plurality of light emitting points which emit the plurality of beams and a collimator lens which collimates the plurality of beams, the plurality of beams being emitted from said light source as a plurality of collimated beams collimated by the collimator lens;

a first optical system including a first fixed lens group placed on a light source side of said first optical system and a movable lens group having negative finite transverse magnification with respect to images formed by said first fixed lens group, said first optical system converging each of the plurality of beams emitted from said light source in an auxiliary scanning direction perpendicular to the main scanning direction;

a moving mechanism which holds said movable lens group to be movable along an optical axis of said collimator lens and selectively stops said movable lens group at a first position and a second position only, the first and second positions being determined so that transverse magnification Mp_1 of said movable lens group with respect to the images formed by said first fixed lens group when said movable lens group is placed at the first position and transverse magnification Mp_2 of said movable lens

group with respect to the images formed by said first fixed lens group when said movable lens group is placed at the second position will satisfy $Mp_1 \times Mp_2 = 1 \dots (1)$;

a deflecting system that dynamically deflects the plurality of beams simultaneously in the main scanning direction at a position in the vicinity of a line image formation position where a plurality of line images are formed by the convergence of the beams in the auxiliary scanning direction by said first optical system; and

a second optical system which converges the dynamically deflected beams in the main scanning direction and in the auxiliary scanning direction to focus in the vicinity of said scan target surface and thereby forms a plurality of scan lines on said scan target surface.

2. The scanning optical system according to claim 1, wherein an interval P_1 between the scan lines when said movable lens group is placed at the first position and an interval P_2 between the scan lines when said movable lens group is placed at the second position satisfy:

$$Mp_1 = - (P_1/P_2)^{1/2} = 1/Mp_2 \dots (2).$$

3. The scanning optical system according to claim 1, wherein said first optical system consists of:

said first fixed lens group having negative refractive

power in the auxiliary scanning direction and thereby forming the images as virtual images; and

said movable lens group having positive refractive power in the auxiliary scanning direction.

4. The scanning optical system according to claim 2, wherein the transverse magnification M_{p1} of said movable lens group in the auxiliary scanning direction when said movable lens group is placed at the first position is approximately -1.41, and the transverse magnification M_{p2} of said movable lens group in the auxiliary scanning direction when said movable lens group is placed at the second position is approximately -0.71.

5. The scanning optical system according to claim 1, wherein said first optical system includes:

said first fixed lens group having positive refractive power in the auxiliary scanning direction and thereby forming the images as real images;

said movable lens group having negative refractive power in the auxiliary scanning direction and thereby forming virtual images of the real images; and

a second fixed lens group having positive refractive power in the auxiliary scanning direction and thereby forming real images of the virtual images.

6. The scanning optical system according to claim 2, wherein the transverse magnification Mp_1 of said movable lens group in the auxiliary scanning direction when said movable lens group is placed at the first position is approximately -1.22, and the transverse magnification Mp_2 of said movable lens group in the auxiliary scanning direction when said movable lens group is placed at the second position is approximately -0.82.

7. The scanning optical system according to claim 1, wherein said moving mechanism includes:

- a first fixed mount on which said first fixed lens group is mounted;

- a second fixed mount placed at a preset distance from said first fixed mount;

- a movable mount placed between said first and second fixed mounts on which said movable lens group is mounted;

- a guide held by said first and second fixed mounts and inserted into a through hole of said movable mount;

- a screw rotatably held by said first and second fixed mounts and inserted into a through hole of said movable mount having an engaging mechanism for smoothly engaging with said screw; and

- a rotating mechanism for rotating the screw,

wherein said movable lens group is stopped at the first position when said movable mount makes contact with said first

fixed mount, and

said movable lens group is stopped at the second position when said movable mount makes contact with said second fixed mount.